ORION
Power Systems

SCR2 10kVA Online UPS

POWER AVAILABILITY

USER MANUAL

On-Line UPS
127/220V 120/208V

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WARNING

Opening or removing the cover may expose you to lethal voltages within this unit even when it is apparently not operating and the input wiring is disconnected from the electrical source. Observe all cautions and warnings in this manual. Failure to do so may result in serious injury or death. Refer all UPS and battery service to qualified service personnel. Do not attempt to service this product yourself. Never work alone.

SAVE THESE INSTRUCTIONS

This manual contains important safety instructions. Read all safety, installation and operating instructions before operating the Uninterruptible Power System (UPS). Adhere to all warnings on the unit and in this manual. Follow all operating and user instructions. Individuals without previous training can install and operate this equipment.

It is not intended for use with life support and other designated critical devices. Maximum load must not exceed that shown on the UPS rating label. If uncertain, consult your local distributor or Sales representative.

This UPS is designed for use on a properly grounded (earthed), 100/200, 110/220, 115/230, 120/208, 120/240 or 127/220 VAC, 50 Hz or 60 Hz supply. The factory default setting is 127/220 VAC, 60 Hz. Installation instructions and warning notices are located in this manual.

This UPS is only for use with a four-wire input (L1, L2, N, G).

This UPS MAY NOT be used with a three-wire, single-phase utility source (L1, N, G).

ELECTROMAGNETIC COMPATIBILITY—The Series complies with the limits for a CLASS A DIGITAL DEVICE, PURSUANT TO Part 15 of FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation. Operating this device in a residential area is likely to cause harmful interference that users must correct at their own expense.

Operate the UPS in an indoor environment only in an ambient temperature range of 32°F to +104°F (0°C to +40°C). Install it in a clean environment, free from conductive contaminants, moisture, flammable liquids, gases and corrosive substances.

This UPS contains no user serviceable parts except the internal battery pack. The Off/Bypass push button does not electrically isolate internal parts. Under no circumstances attempt to gain access internally other than to replace the batteries due to risk of electric shock or burn. Do not continue to use the UPS if the front panel indications are not in accordance with these operating instructions or if the UPS performance alters in use. Refer all faults to your local distributor, Sales representative or the Sales Technical Support Group.

Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from the batteries. PROPER DISPOSAL OF BATTERIES IS REQUIRED. REFER TO YOUR LOCAL LAWS AND REGULATIONS FOR BATTERY DISPOSAL REQUIREMENTS.

Never block or insert any object into the ventilation holes or other openings of the UPS.

DO NOT CONNECT equipment that could overload the UPS or demand half-wave rectification from the UPS, for example: electric drills, vacuum cleaners, laser printers, hair dryers or any other appliance using half-wave rectification.

Storing magnetic media on top of the UPS may result in data loss or corruption.

Turn the UPS off and isolate the UPS before cleaning; use only a soft cloth, never liquid or aerosol cleaners. Keep the front and rear vents free of dust accumulation that could restrict airflow.

When replacing batteries, replace with the same authorized replacement battery kits.

When replacing power module, replace with the same authorized replacement power module kit.

CAUTION

Do not dispose of battery or batteries in a fire. The battery may explode.

Do not open or mutilate the battery or batteries. Released electrolyte is harmful to skin and eyes. It is toxic.

CAUTION

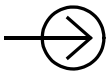
A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working on batteries:

- Remove watches, rings and other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots.
- Do not lay tools or metal parts on top of batteries.
- Disconnect charging source prior to connecting or disconnecting battery terminals.
- Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source of ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock will be reduced if such grounds are removed during installation and maintenance (applicable to a UPS and a remote battery supply not having a grounded supply circuit).

1.0 GLOSSARY OF SYMBOLS

Risk of electrical shock

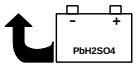
Indicates caution followed by important instructions



AC input

AC output

Requests the user to consult the manual



Indicates the unit contains a valve-regulated lead acid battery

Recycle

DC voltage

Equipment grounding conductor

Bonded to ground

AC voltage

ON/Alarm Silence/Battery Test

OFF/Bypass

2.0 INTRODUCTION AND SYSTEM DESCRIPTION

Congratulations on your choice of the Online 10Kva RT 127V Uninterruptible Power Supply (UPS). It provides conditioned power to microcomputers and other sensitive electronic equipment.

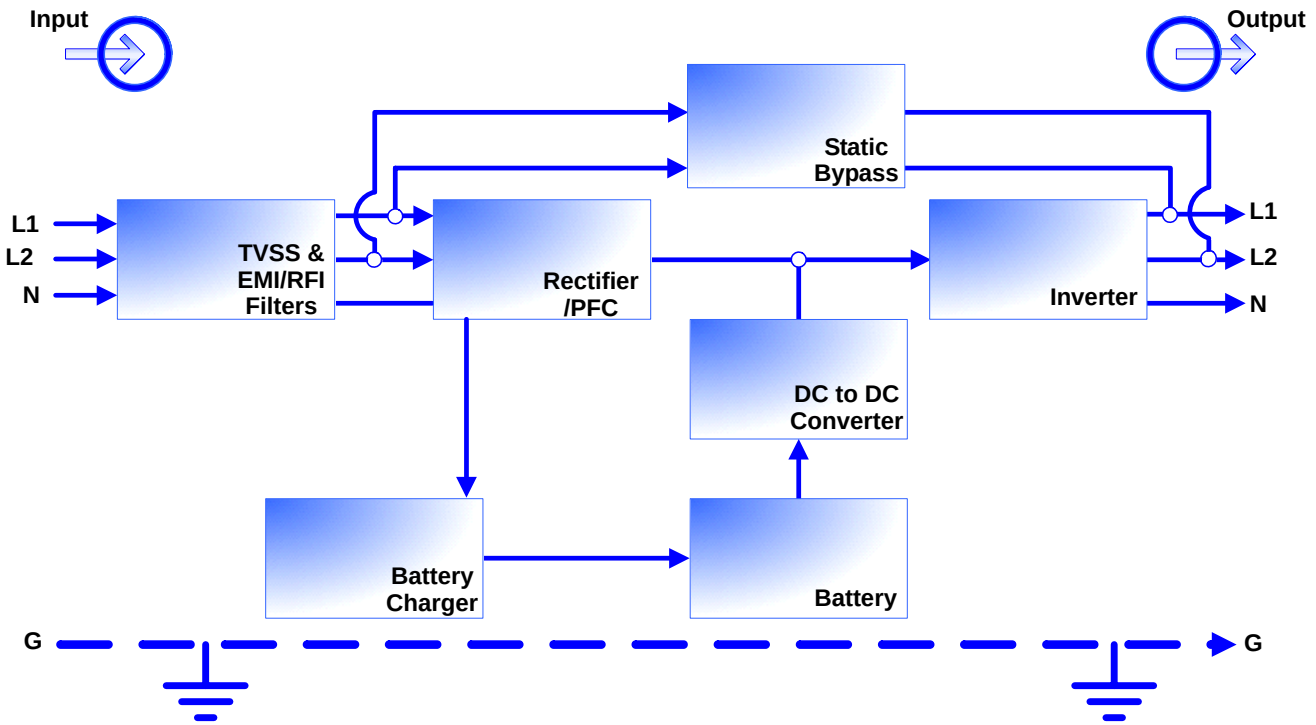
Upon generation, AC power is clean and stable. However, during transmission and distribution it is subject to voltage sags, spikes or complete power failure that may interrupt computer operations, cause data loss or even damage equipment. The UPStation 10Kva RT protects equipment from these disturbances.

The 10Kva RT is a compact, on-line UPS. An on-line UPS continuously conditions and regulates its output voltage whether utility power is present or not. It supplies connected equipment with clean sinewave power. Sensitive electronic equipment operates best from sinewave power.

For ease of use, the 10Kva RT features a light-emitting diode (LED) display to indicate both load percentage and battery capacity. It also provides self-diagnostic tests, a combination ON/Alarm Silence/Battery Test button, a Standby button, user configurable program and two levels of alarms when the unit is operating on battery.

The 10Kva RT has an interface port for communication between the UPS and a network server or other computer systems. This port provides detailed operating information including voltages, currents and alarm status to the host system when used in conjunction with Winpower software. Winpower software can also control UPS operation remotely.

3.0 System Description



3.1 Transient Voltage Surge Suppression (TVSS) and EMI/RFI Filters

These UPS components provide surge protection and filter both electromagnetic interference (EMI) and radio frequency interference (RFI). They minimize any surges or interference present in the utility line and keep the sensitive equipment protected.

3.2 Rectifier/Power Factor Correction (PFC) Circuit

In normal operation, the rectifier/power factor correction (PFC) circuit converts utility AC power to regulated DC power for use by the inverter while ensuring that the waveshape of the input current used by the UPS is near ideal. Extracting this sinewave input current achieves two objectives:

- The utility power is used as efficiently as possible by the UPS.
- The amount of distortion reflected on the utility is reduced.

This results in cleaner power being available to other devices in the building not being protected by the 10Kva RT.

3.3 Inverter

In normal operation, the inverter utilizes the DC output of the power factor correction circuit and inverts it into precise, regulated sinewave AC power. Upon a utility power failure, the inverter receives energy from the battery through the DC to DC converter. In both modes of operation, the UPS inverter is on-line and continuously generating clean, precise, regulated AC output power.

3.4 Battery Charger

The battery charger utilizes energy from the utility power and precisely regulates it to continuously float charge the batteries. The batteries are being charged whenever the 10Kva RT is plugged in, even when the UPS is not turned on.

3.5 DC to DC Converter

The DC to DC converter utilizes energy from the battery system and raises the DC voltage to the optimum operating voltage for the inverter. This allows the inverter to operate continuously at its optimum efficiency and voltage, thus increasing reliability.

3.6 Battery

The 10Kva RT utilizes valve-regulated, nonspillable, flame retardant, lead acid batteries. To maintain battery design life, operate the UPS in an ambient temperature of 68°F to 77°F (20°C to 25°C). Optional external battery cabinets are available to extend battery run times.

3.7 Static Bypass

The 10Kva RT provides an alternate path for utility power to the connected load in the unlikely event of a UPS malfunction. Should the UPS have an overload, overtemperature or UPS failure condition, the UPS automatically transfers the connected load to bypass. Bypass operation is indicated by an audible alarm and illuminated amber Bypass indicator (other indicators may be illuminated to indicate the diagnosed problem).

The user may manually transfer the connected load from the inverter to bypass by pressing the Standby button once.

NOTE

The bypass power path does NOT protect the connected equipment from disturbances on the utility supply.

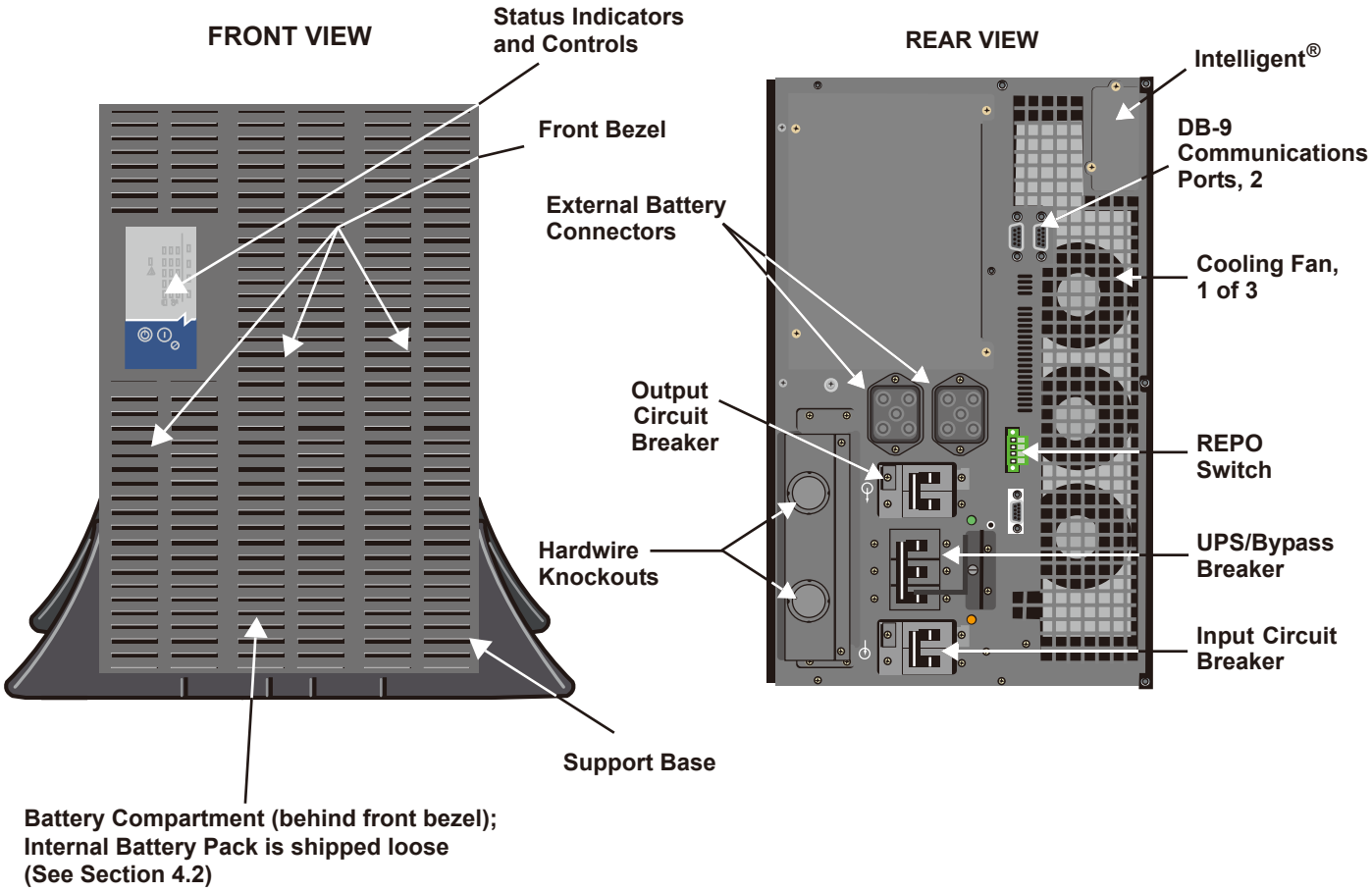
4.0 MAJOR COMPONENTS

The 10Kva RT is composed of three major assemblies to provide easier handling, installation and versatility.

4.1 Main Frame and Electronics

This 6U cabinet arrives without internal batteries to lighten the UPS for easier installation. Once the cabinet has been placed in its final floor or rack position, the internal batteries may be installed. The UPS is shipped with standard hardwire terminal blocks for input and output connections.

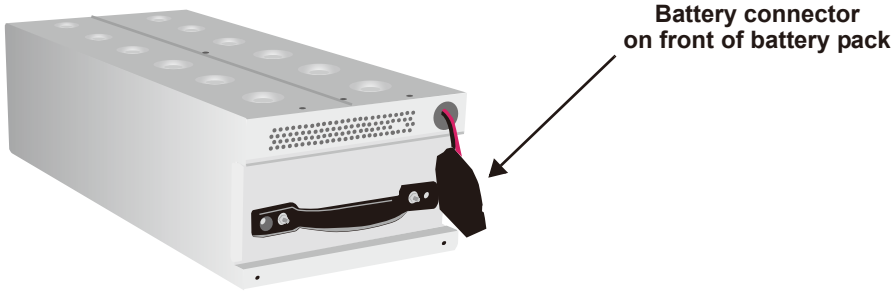
Figure 1 10Kva RT Dual Inverter (front and rear views)



4.2 Internal Battery Pack

The center front bezel can be removed by unscrewing the side mounted screws to reveal the battery access plate. The cover plate can be removed by extracting the three screws at the top of the cover plate and lifting the plate off. The two internal battery packs are compact assemblies ready to slide into the battery compartment after the front battery access plate has been removed. Electrical connection is made with the two slotted battery connectors.

Figure 2 Internal battery pack and connector



4.3 Input/Output Terminal Blocks and Optional Output Distribution

The UPS is shipped with hardwire terminal blocks. For maximum flexibility, additional distribution options are available that provide the benefit of output receptacle convenience.

Figure 3 Hardwire terminal blocks

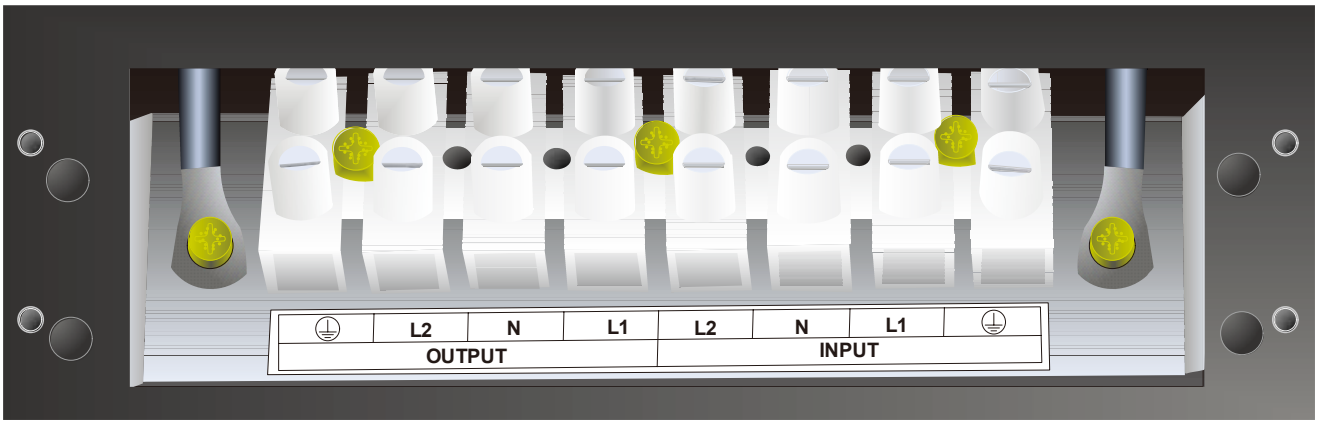
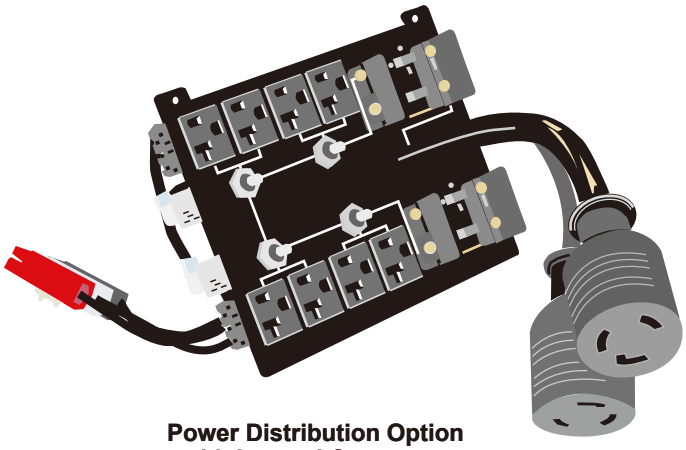
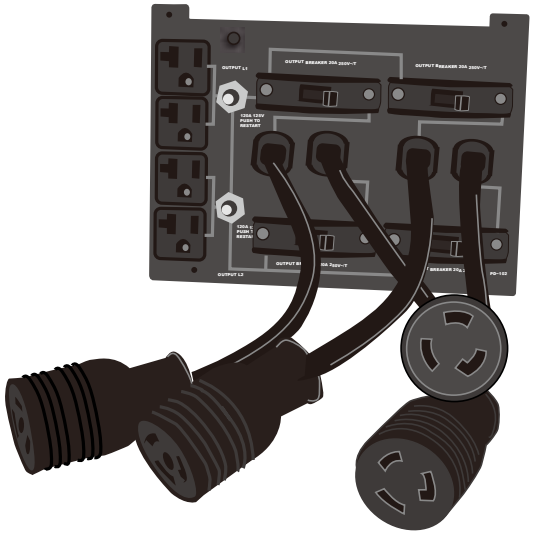


Figure 4 Optional output distribution modules



Power Distribution Option with Internal Connector



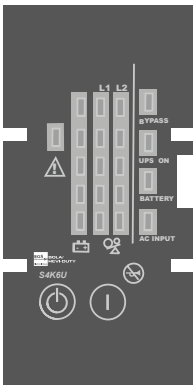
Power Distribution Option

5.0 WHAT'S INCLUDED

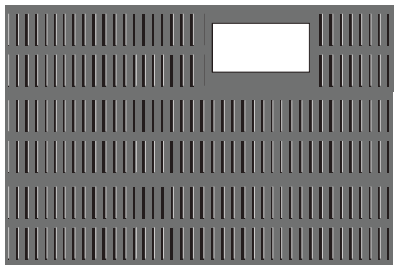
The RT 10Kva is shipped with the following items:

- RT 10Kva user manual
- Vertical display overlay
- Front bezels
- Top bezels
- Battery cover grille
- Power Modulecovergrille
- Battery packbrackets - 2
- Serialcable, 10 ft. (3m)
- Rackmounthandles
- Support bases - 2
- Mountinghardware
- Ferrite beads(2)

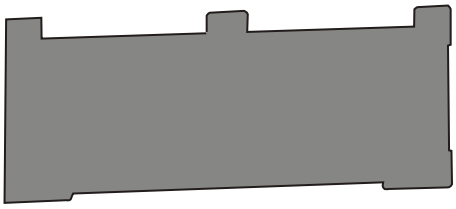
Box containing accessories is shipped in the UPS' battery compartment



Vertical display overlay

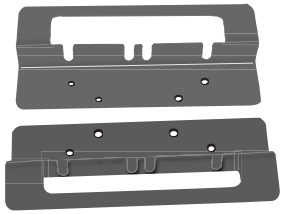


Front bezels



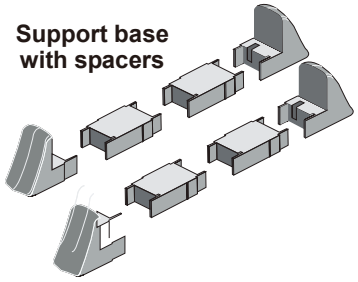
Battery cover

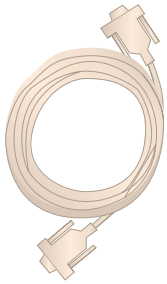
Battery brackets



Rack-mount handles

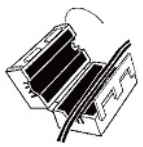
Support base with spacers

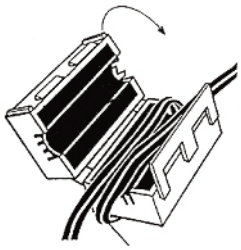




serial cable 10 ft (3m)

Mounting hardware





Ferrite beads (2)

6.0 INSTALLATION AND CONFIGURATION

This section includes instructions on how to install, configure and perform initial electrical checks of your UPS installation.

DO NOT attempt to start the UPS, turn on any circuit breaker or energize the input power until instructed to do so in **7.0 - Initial Startup and Electrical Checks**.

Visually inspect the UPS for freight damage. Report damage to the carrier and your local distributor or Sales representative.

CAUTION

The UPS is heavy (see **14.0 - Specifications**). Take proper precautions when lifting or moving it.

Install the UPS indoors in a controlled environment, where it cannot be accidentally turned off. Place it in an area of unrestricted airflow around the unit, away from water, flammable liquids, gases, corrosives and other conductive contaminants. Maintain a minimum clearance of 4" (100mm) in the front and rear of the UPS. Maintain an ambient temperature range of 32°F to 104°F (0°C to 40°C).

NOTE

UPS operation in sustained temperatures above 77°F (25°C) reduces battery life.

6.1 Install the Main Cabinet

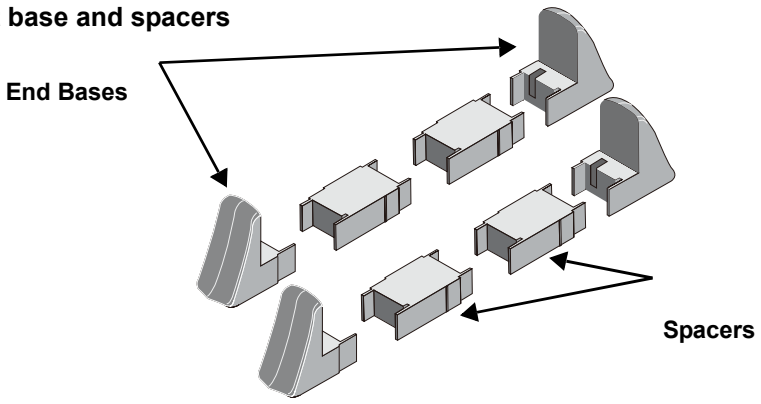
The RT 10Kva may be installed either as a tower unit or in a rack, depending on available space and use considerations. Determine the type of installation and follow the appropriate instructions in either **6.1.1 - Tower UPS Installation** or **6.1.2 - Installing the Adjustable Rack-Mount Kit.** .

6.1.1 Tower UPS Installation

When using the RT 10Kva in a tower configuration, use the included support base (shown below, left) to stabilize the UPS.

If any external battery cabinets are added, they will include spacers to accommodate the additional cabinets (shown in **Section 6.2**).

Figure 5 Support base and spacers



Attach Bezels to Top

When used as a tower, the RT 10Kva requires bezels attached to the top. To connect the bezels:

1. Position the UPS so that the battery compartments are on the right side.
2. Attach the top bezels by placing them on the mounting holes and sliding them toward the rear of the UPS.

6.1.2 Installing the Adjustable Rack-Mount Kit

This kit contains parts needed to mount several different models of UPS and external battery cabinets into EIA310-D standard four-post racks that are 18-32" deep (457-813mm). The weight limit per pair of adjustable rack-mounting brackets is 270 pounds (123 kg).

RT 10Kva rack-mount bracket kit, includes:

Item	Quantity
Rear bracket members	2
Front bracket members	2
Inner bracket members	2
M4 x 8mm machine screws	16
M4 locking hex nuts	8
M5 x 16 mm machine screws	12
Grease packet.	1

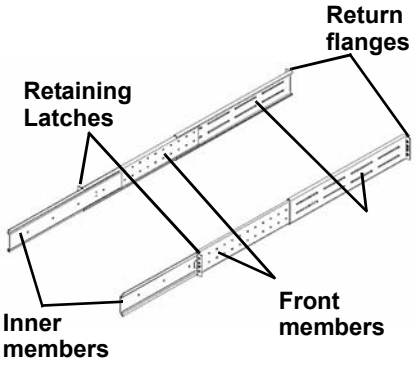
Tools needed for installation are:

- one Phillips screwdriver
- one 7mm wrench

The adjustable rack-mounting brackets feature retaining latches to prevent users from inadvertently sliding the UPS or battery cabinet out of the rack.

To install the rack mount brackets:

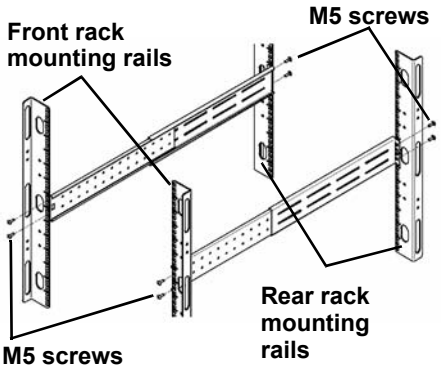
1. Unpack two (2) rack-mounting bracket assemblies and mounting hardware from this kit. Bracket assemblies are interchangeable between left-hand or right-hand.
   Remove inner member of each bracket assembly as shown in at right by extending it to its outermost position, depressing the retaining latch and then pulling the inner member out of the bracket assembly.
2. Determine the height position inside the rack enclosure where you want to mount the UPS or battery cabinet.



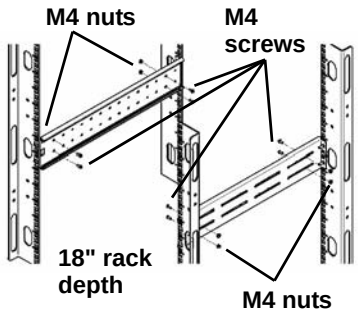
CAUTION

Reduce the risk of tipping the rack enclosure by placing the UPS or battery cabinet in the lowest possible rack position.

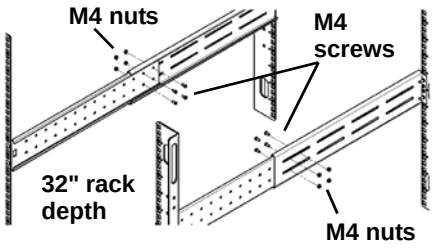
3. Install the rear member of each bracket assembly into rack enclosure with two (2) M5 screws provided in this kit (see figure at right). The return flanges on the bracket assembly fit to the inside of rack mounting rails. Insert screws loosely (finger-tight) into the top and bottom holes of the return flange on the rear member. Extend the bracket assembly by sliding the front member forward until it touches the front rack mounting rail. Insert two (2) M5 screws loosely (finger-tight) into top and bottom holes of the return flange on each front member. Make sure bracket assemblies are at the same mounting height on all four (4) rack mounting rails.



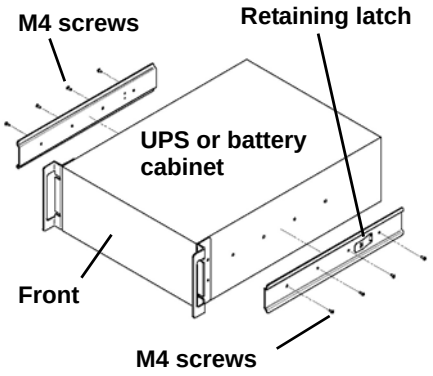
4. Get eight (8) M4 screws and eight (8) M4 nuts from the hardware pack in this kit. Each nut has a locking, nylon insert that begins gripping the screw when it is halfway tight. Make sure to tighten the nut and screw completely to ensure locking action.Fasten the rear member and the front member together using (4) screws and (4) nuts per bracket assembly as shown in at right. For maximum support, insert fasteners for each bracket assembly as far apart as possible, depending on rack depth, while still joining both members (see figures at right). Check alignment of bracket assemblies and TIGHTEN ALL SCREWS FROM **Steps 2** and **3**.



5. Prepare the UPS or battery cabinet (the "equipment") for rack mounting by following instructions in the equipment's user manual. The equipment may require additional parts to be added or parts to be removed for rack mounting. After it is prepared, lay the equipment in rack-mounting position. Fasten the inner members from **Step 1** to the equipment on both sides as shown at right with eight (8) M4 screws provided in the kit. Make sure retaining latch is near the rear of the equipment as shown (see figure at right).



6. Open the grease packet provided in the kit. Apply a 1" long bead of grease at four (4) places inside the bottom, curved tracks of the front members as shown below right. The grease will allow the equipment to slide into the bracket assemblies more easily.

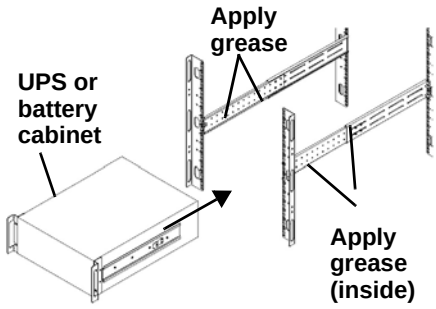


CAUTION

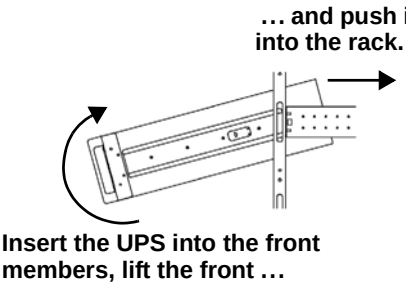
Lifting equipment into the rack may be a two-person job, depending on the weight of the equipment. (See equipment's user manual.)

7. Insert the equipment, with inner members attached in **Step 5**, into the bracket assemblies by inserting the top and bottom edges of the inner members into the top and bottom curved tracks of the front members and sliding the equipment into the rack (see figure at right). Ends of inner members are tapered to allow the rear of the equipment to be angled upward before insertion, if space allows.

   Then the rear, bottom edges of the inner members can be placed into the front edge of the bottom tracks and the front of the equipment can be tipped up so they are level to insert the top edges of the inner members before sliding the equipment into the rack (see figure below right). The equipment should move smoothly into the bracket assemblies. If it does not, recheck the alignment of the front and rear members from **Steps 2** and **3**.



8. Secure the front of the equipment to the rack mounting rails to prevent the equipment from sliding out of position. If securing holes are provided on the front of the equipment that align with the center holes on the return flange of the front members, you can use the four (4) extra M5 screws provided in the kit to secure the equipment. Otherwise, the equipment should be secured to the front of the rack with four (4) customer-supplied fasteners.



6.2 External Battery Cabinet Installation

Optional RT 10Kva external battery cabinets may be connected to the UPS to provide additional battery run time. External battery cabinets are designed to be placed on one side of the UPS or stacked beneath the UPS.

The external battery cabinet frame and battery kits are shipped separately. This 4U cabinet arrives without internal batteries to lighten the cabinet for easier installation. Once the cabinet has been placed in its final floor or rack position, the internal batteries may be installed.

CAUTION

The external battery cabinet(s) are heavy (see **14.0 - Specifications**). External battery cabinets can be used in rack-mount or tower configuration. Take proper precautions when lifting them.

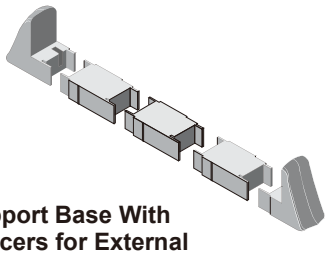
CAUTION

Verify that the battery cabinet circuit breaker is in the OFF position. Dot no energize the battery cabinet at this time. When installation is complete, you will be instructed to turn on the circuit breaker.

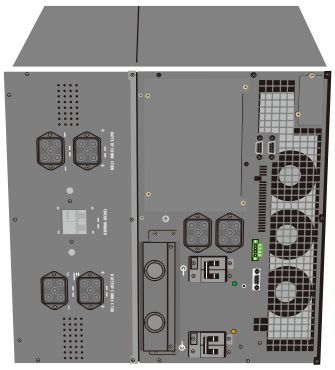
When the external battery cabinet is received, it should be inspected for freight damage. Report damage to the carrier and your local distributor or sales representative.

To install an external battery cabinet:

1. For slide rail installations, first remove the top bezel. Optional rack-mount handles are shipped with the external battery cabinet and may be installed now.
2. Fasten the slides into position with the screws according to the instructions included with the slide rails.
3. Use the enclosed support bases for the tower option to prevent the assembly from tipping over. One additional set of support base extensions ships with each external battery cabinet.
4. Install the two battery packs and secure with the two brackets supplied.
5. Connect the two slotted battery cables.
6. Attach the battery cover plate and the two front bezels.
7. Connect the supplied external battery cabinet cables to either set of connectors on the rear of the external battery cabinet, then to the rear of the UPS.
8. The UPS is now equipped with additional backup battery run time. For approximate battery run times, refer to **Table 6 - Battery run times** in this manual.
9. Do NOT turn on the battery cabinet circuit breaker at this time. Please complete the remainder of the installation first.



Support Base With Spacers for External Battery Cabinets



UPS and External Battery Cabinet

NOTE

UPS automatically detects the number of standard batteries that are connected. The configuration program may be used to set up the UPS for operation with non-standard external batteries.

6.3 Connect Input/Output Power

The UPS has hardwire terminal blocks for input and output electrical connections. Optional output distribution modules permit connecting additional loads to the UPS. These optional plug-and-play distribution modules offer different types and numbers of connection plugs.

WARNING

The UPS must be completely powered down before beginning to make these electrical connections.

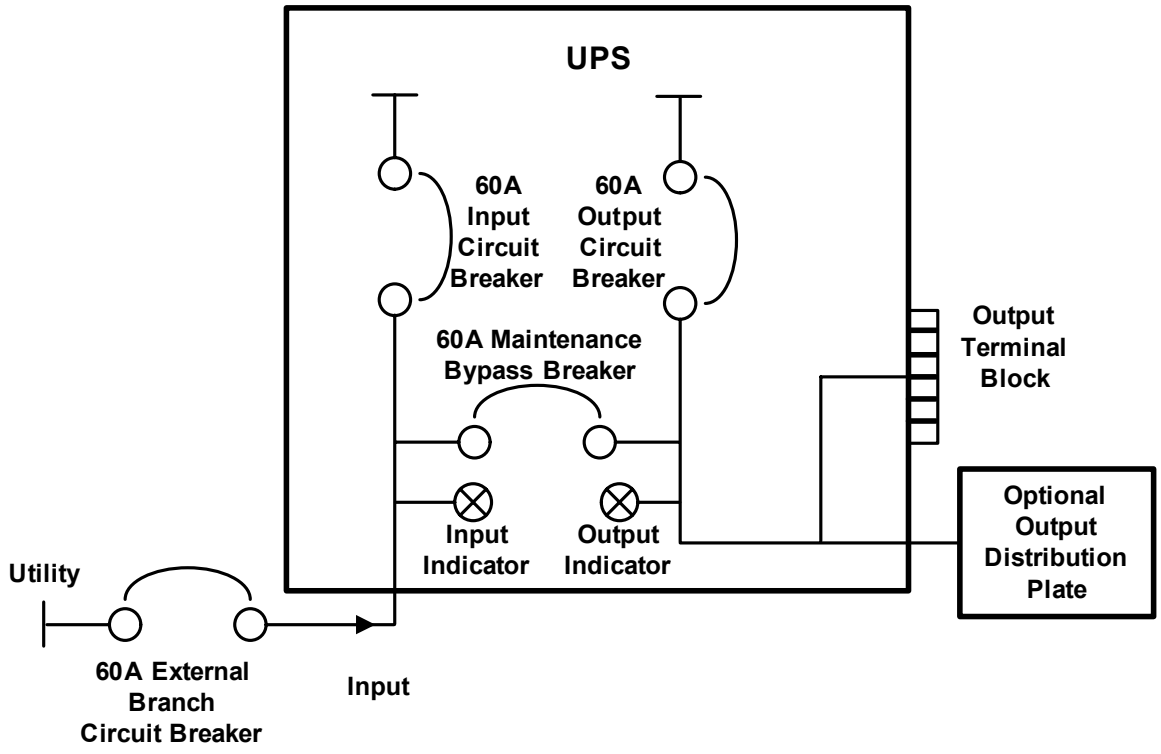
6.3.1 Distribution Module Electrical Connections

Electrical connections are made through a removable conduit box that attaches to the rear of the UPS.

The installer must provide a 60A branch circuit breaker. The input circuit breaker and the output circuit breaker on the rear fixed-panel of the UPS disconnect all power between the main cabinet and the distribution box.

The manual bypass switch passes utility power directly to the bypass switch from the input terminal block. The input circuit breaker does not disconnect power from the manual bypass switch.

Figure 6



CAUTION

A disconnect switch shall be provided by others for AC input circuit. To reduce the risk of fire, connect only to a circuit provided with branch circuit over-current protection for 60 amperes rating in accordance with the National Electric Code, ANSI/NFPA 70.

CAUTION

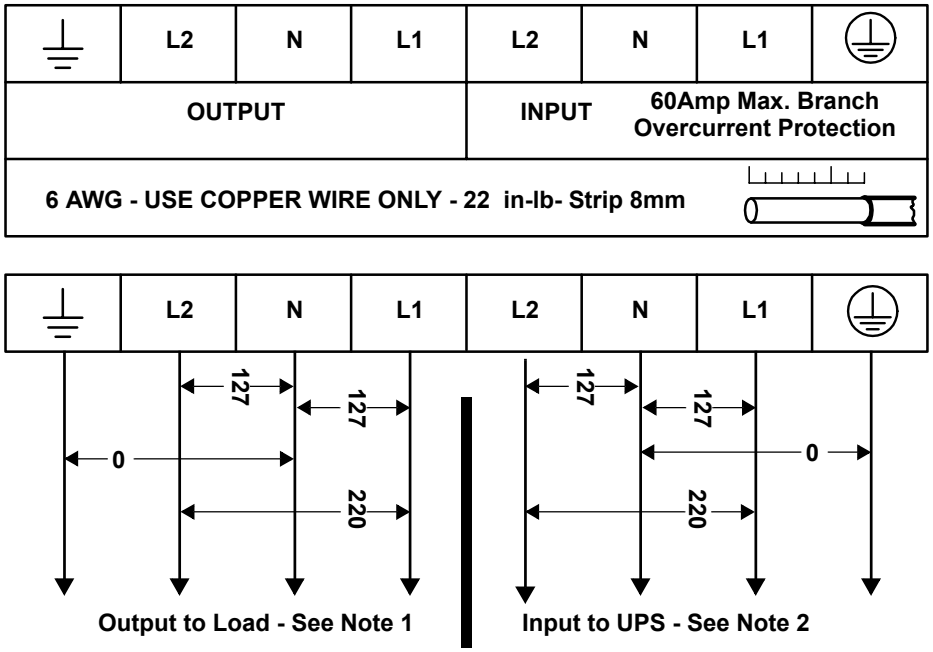
A disconnect switch shall be provided by others for AC output circuit. To reduce the risk of fire, connect only to a circuit provided with branch circuit overcurrent protection for 60 amperes rating in accordance with the National Electric Code, ANSI/NFPA 70."

6.3.2 Input & Output Terminal Block Connections

Conduit entry holes are provided on the rear and side of the box. Input and output wiring should not share the same conduit.

Table 1 Electrical requirements

Input Current Rating	Recommended (Max.) External Overcurrent Protection	Recommended Wire (including ground wire) (75°C copper wire)	Maximum Wire Accepted by Terminal Block	Terminal Tightening Torque
48A	60A	6 AWG	4 AWG	22 in-lb (2.48N-m)



NOTE

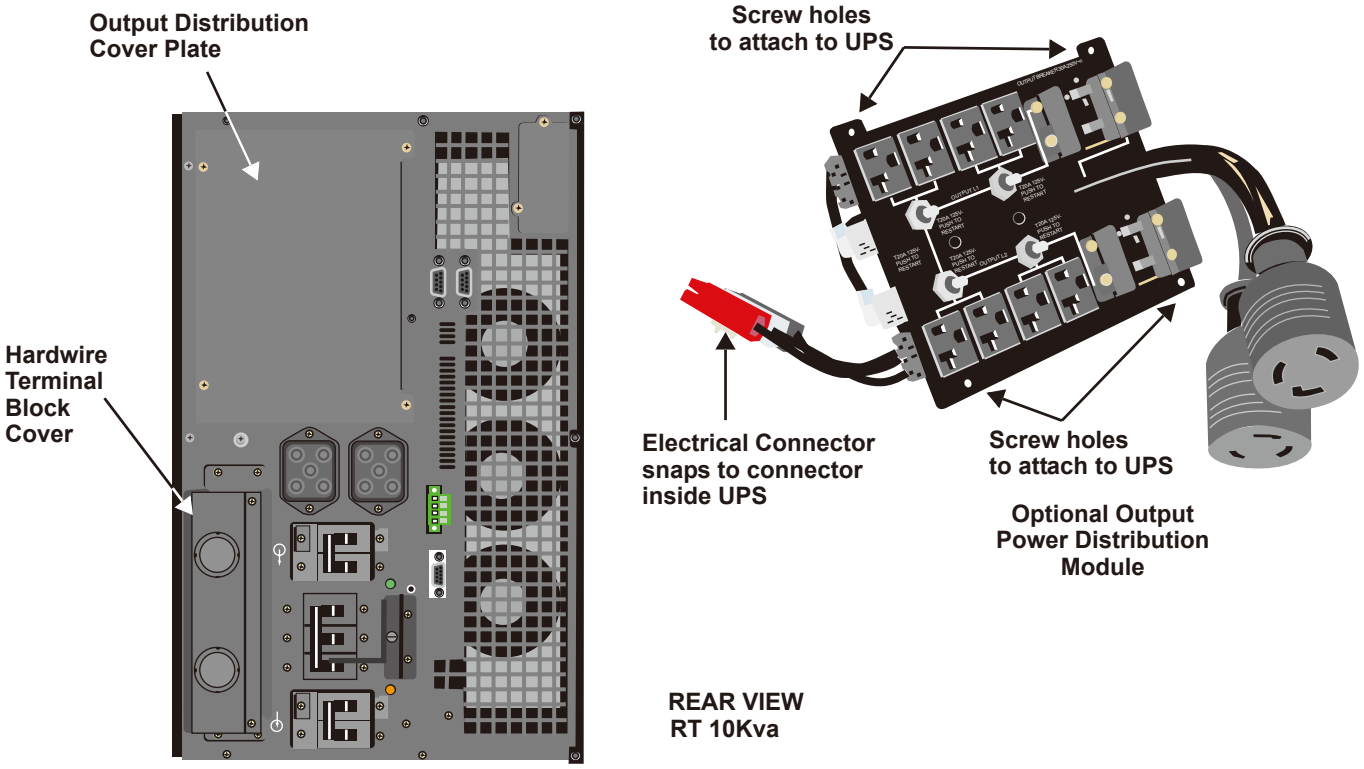
1. *The installer must provide circuit breaker protection according to local codes. The utility disconnect should be within sight of the UPS or have an appropriate lock-out. Maintain service space around the UPS or use flexible conduit.*
2. *The installer must provide output distribution panels, circuit breaker protection or emergency disconnects according to local codes. Output circuits must not share a common conduit with any other wiring.*

For best performance, distribute all L-N loads evenly between L1 and L2.

6.3.3 Add an Output Power Distribution Module—Optional

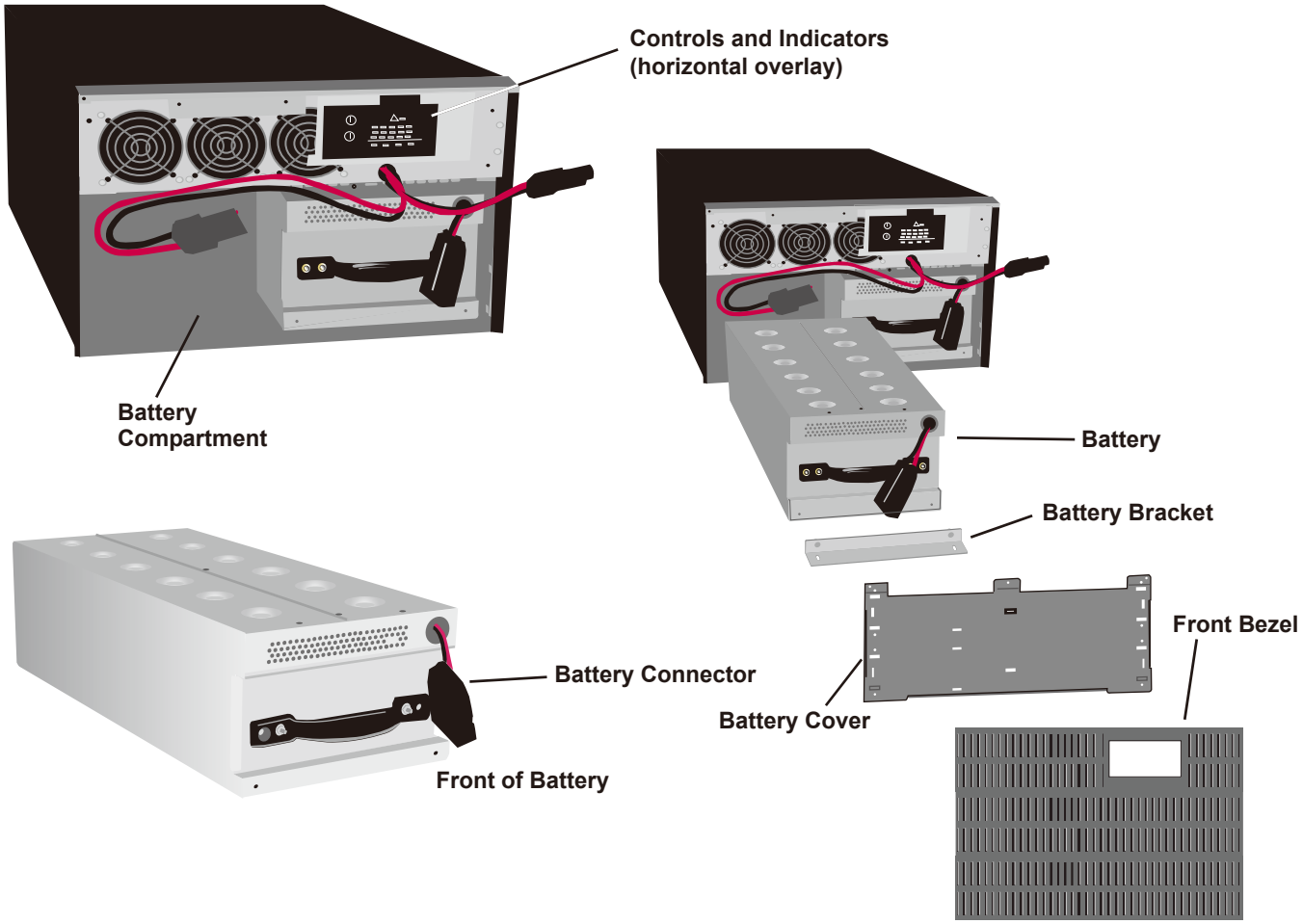
To add an optional output distribution module to the RT 10Kva:

1. Remove the four screws securing the blank output distribution cover plate to the rear of theUPS. The cover is at top left corner in the tower configuration and at the bottom left in the rack configuration.
2. Set the screws aside to attach output distribution module to UPS.
3. Snap together the electrical connectors on the UPS and on the output distribution.
4. Use the screws removed in **Step 2** to attach the output distribution to the rear of the UPS.


Output Distribution Cover Plate
Hardwire Terminal Block Cover
Screw holes to attach to UPS
Electrical Connector snaps to connector inside UPS
Screw holes to attach to UPS
Optional Output Power Distribution Module
REAR VIEW RT 10Kva

6.4 Install the Internal Battery Packs

To facilitate shipping and installation, the RT 10Kva ships without the internal battery packs installed. Once the UPS is installed in place, the internal battery packs must be installed.



1. Unpack the two internal battery packs from their shipping container.
2. Lift one battery pack from its packaging, holding it in the center of the pack.
3. Align the battery pack so that the cable is at the top right closest to the power module in the frame.
4. Slip the back of battery pack into the battery compartment and slide it in until the battery reaches the back of the UPS.
5. Install the battery bracket on the front of the battery pack with two screws.
6. Connect the two slotted connectors and tuck the wires in around the battery pack handles.
7. Repeat for the second battery pack.
8. Install the battery cover grille, tightening the three screws.
9. For tower installation, place the vertical overlay over the controls and indicators (see **Figure 9**).
10. Install the front bezels.

7.0 INITIAL STARTUP AND ELECTRICAL CHECKS

Initial Startup and the Configuration Program—The UPS ships with a default 127 VAC L-N setting. This is also the most robust setting in that it can operate with either input phase angle (120 degrees). Perform initial system checks first. If the UPS configuration needs to be modified for your application, then go to the next section to review use of the configuration program. Some configuration changes require that the UPS be in the OFF mode while powered from the utility. Therefore, the installer must confirm that the UPS input has been properly wired. After re-configuring your UPS, the UPS may be put into service with the intended loads.

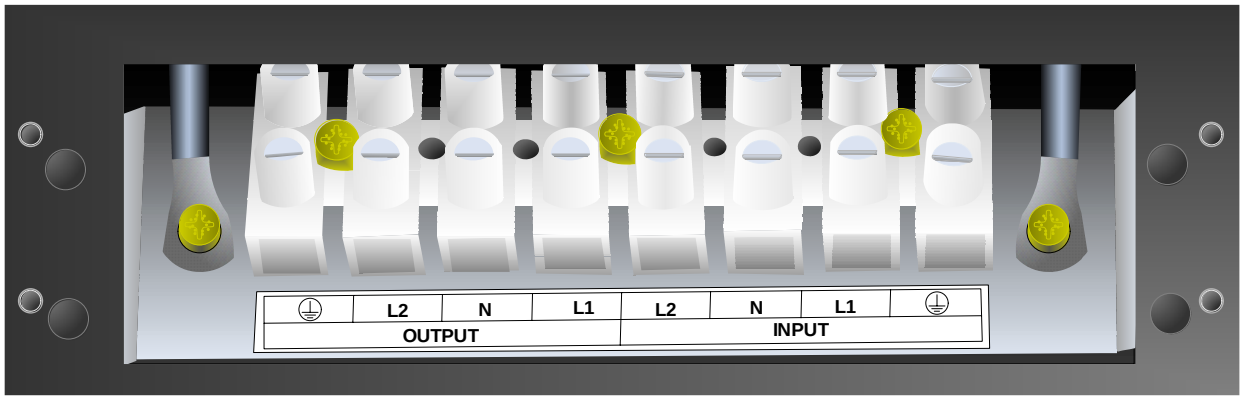
7.1 Hardwire Input Connections

WARNING

Miswiring power to the input terminal block (L1-L2-N-G) or connecting to single-phase voltages (L-N-G only) may damage the UPS.

1. Verify that the input and output circuit breakers are off. (To locate the circuit breakers, see **Figure 1**.)
2. During initial system checks, disconnect all loads (open load disconnects).
3. Inspect all wiring, cables and connection.
4. If external battery cabinets are used, verify that the battery interconnect cables are fully inserted into the sockets.
5. Turn on the battery cabinet circuit breaker.
6. Place the manual bypass breaker in the BYPASS position. The slide bracket may need to be moved out of the way to move the breaker.
7. Turn on the branch circuit disconnect to apply voltage to the input terminal block (see **6.3.1 - Distribution Module Electrical Connections**).
8. Using a voltmeter, verify the expected L1-N, L2-N and L1-L2 voltages.
   a. The bypass lamp by the switch will light.
   b. If the configuration program has been used to set the L-N voltage at 100, 110 or 115, then the input phase angle is required to be 180 degrees.
   c. If the configuration program as been used to set the L-N voltage at 120 VAC, then the input phase angle is required to be 120 or 180 degrees (leading or lagging).
9. After verifying proper input voltage to the UPS terminal block, turn off the branch circuit power, close all access panels to the distribution box and reapply input power.
10. Close the input circuit breaker located on the rear of the UPS. The green AC Input indicator should illuminate on the front panel.
11. Press the On button for one second. The bypass indicator will light for several seconds before the UPS ON indicator turns on continuously. If the batteries are charged above 90% of capacity, an automatic battery test will run for about 15 seconds.
12. Close the Output circuit breaker on the rear of the UPS. Transfer the manual bypass breaker to the UPS position. Slide the bracket back in place and tighten the thumbscrew. The output terminal block will be powered at this time.
13. Review all setting option provided by the configuration program. Some changes require that the UPS be OFF. If this is the case, these should be programmed before powering the loads. The configuration program is described in **8.0 - Configuration Program**.
14. Connect all loads for normal operation.

Figure 7 Hardwire terminal connections



7.2 Output Receptacle Distribution Options

WARNING

A qualified electrician should install the optional output distribution.

1. Verify that the input feeder circuit breaker is off.
2. Verify that the input and output circuit breakers are off.
3. Verify the UPS is completely OFF.
4. Remove the four screws holding the blank access plate from the rear of the UPS.
5. Connect the four-position Anderson connector of the PAD distribution into the mating connector inside the UPS.
6. Using the same four screws, attach the PAD distribution option to the rear of the UPS.
7. Verify all distribution circuit breakers are in the ON position.
8. Follow the initial startup procedures listed in **7.0 - Initial Startup and Electrical Checks**.

8.0 CONFIGURATION PROGRAM

The final step of installation may require custom configuration of your UPS using the enclosed configuration program. Some configuration settings may be changed only while the UPS is off. These should be set before the UPS is put into full time service powering the critical load.

For most users operating with 127 VAC L-N,the factory default settings will be adequate. This manual illustrates the features available For modification, as well as the factory default setting.

The factory default L-N setting is 127VAC. When first powered by the AC input, the UPS will auto sense the utility phase angle between L1 and L2,setting the UPS to operate as either a 127/220VAC system (120 degrees, leading or lagging)

If your application requires that the L1-N,L2-N voltages be set at 100, 110,115 or 120 VAC, the corresponding phase angle between L1 and L2 is restricted. TheVAC settings of 100, 110 and 115 may work only with a phase angle of 180 degrees. A VAC setting of 120 VAC will work only with a phase angle of 120 degrees (leading or lagging).

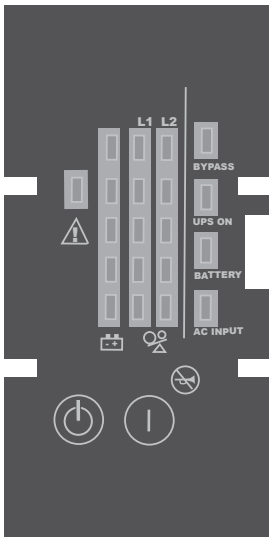
To confirm the phase angle of the utility input, measure the L1-N,L2-N and L1 L2 VAC of the utility input that is intended for the UPS. If the measured L1-L2 voltage is equal to the average L-N voltage times 2.0, then the phase angle is 180 degrees and the L-N VAC maybe set at 100, 110, 115 or 120 VAC. The nominal L1-L2 voltages for these four settings will be 200, 220, 230 or 240 VAC, respectively.

If the measured L1-L2 voltage is equal to the average L-N voltage times 1.73, then the phase angle is 120 degrees and the L-N VAC maybe set at either 120 or 127 VAC. The nominal L1-L2 voltages for these two settings will be 208 or 220 VAC, respectively. Selecting a L-N nominal voltage that is not compatible with the L1-L2 phase angle detected by the UPS when AC input is applied will result in a fault alarm and the UPS will not operate from utility power.

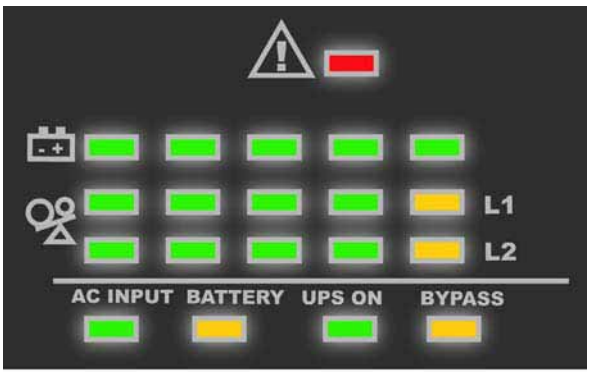
9.0 CONTROLS AND INDICATORS

Figure 8 Control and indicator overlays, vertical and horizontal

Vertical overlay for tower installation



All indicators lit for illustrative purposes.

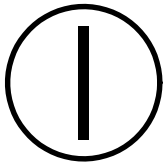


Horizontal overlay for rack mounting

9.1 ON/Alarm Silence/Battery Test Button

This button controls output power to connected load(s) and has three functions:

- ON
- Alarm Silence
- Manual Battery Test



ON - Pressing this button will start up the UPS in order to provide conditioned and protected power.

Alarm Silence - To silence alarms, press this button for at least one Second. After the alarm is silenced, the RT 10Kva will reactivate the alarm system to alert of additional problems.

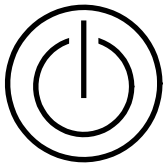
NOTE
The LOW BATTERY and BYPASS reminder alarms CANNOT be silenced.

Manual Battery Test - To initiate a manual battery test, press the ON/Alarm Silence/Battery Test button for at least one second while operating from utility power with no alarm conditions present.

- If only three of the five Battery indicators illuminate, allow the UPS to recharge the batteries for 24 hours.
- After 24 hours, retest the batteries.
- After the batteries have been retested, if only three of the five Battery indicators illuminate, contact your local distributor, sales representative or Technical Support Group.

9.2 OFF/Bypass Button

This button controls output power to connected load(s) and has dual functions: OFF and Bypass.



CAUTION

Pressing the OFF/Bypass button once will cause the load to be transferred to bypass power. Once in Bypass pressing the OFF/Bypass button two times within 4 seconds will turn the UPS off. This will result in a loss of power to the receptacles and connected loads, but the UPS's circuits remain live, charging the units battery. Perform all necessary shutdown procedures on connected loads before pressing this button.

9.3 L1 & L2 Load Level Indicators (Two Rows of Indicators: 4 Green, 1 Amber)

The Load Level indicators display the approximate electrical load placed upon both output legs of the UPS at all times. Each indicator represents an approximate 25 percent increase in load. For optimum utilization of the UPS, distribute L-N loads to approximately balance the loads on L1 and L2. The last LED is amber and indicates the load exceeds 100% of the UPS's capacity.

9.4 Battery Level Indicators (5 Green)

The Battery Level indicators display approximate battery capacity at all times. Each indicator represents an approximate 20 percent increase in battery capacity.

The RT 10Kva is equipped with automatic and remote battery test features.
The automatic test occurs every 14 days (this option is user-configurable) if utility has not been interrupted. Should the battery fail this test, the red Fault indicator along with the A and C diagnostic indicators will illuminate and an alarm will sound (refer to **13.0 - Troubleshooting**). The remote test feature functions with MultiLink 3 software and can remotely initiate the battery test.

9.5 Fault Indicator (Red)

The Fault indicator is illuminated if the UPS has detected a problem. Also, one or more of the Battery Level indicators may be illuminated (refer to **13.0 - Troubleshooting** section).

9.6 Bypass Indicator (Amber)

The Bypass indicator is illuminated when the UPS is operating from bypass power. An alarm will sound indicating the UPS detected a problem or the manual bypass function has been activated.

9.7 UPS ON Indicator (Green)

The UPS ON indicator is illuminated when the UPS inverter is operating and supplying power to your connected loads.

9.8 Battery Indicator (Amber)

The Battery indicator is illuminated when the UPS is operating on battery.

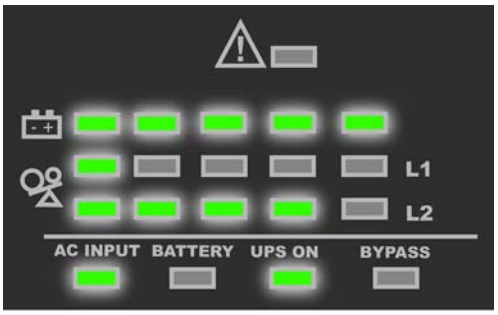
9.9 AC Input Indicator (Green)

The AC Input indicator is illuminated when utility power is available and within the input specifications.

10.0 MODES OF OPERATION

10.1 Normal Mode Operation

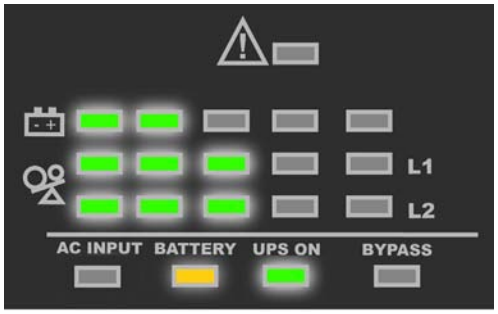
During normal operation, utility power provides energy to the UPS. The filters, power factor correction circuit and the inverter process this power to provide computer grade power to connected loads. The UPS maintains the batteries in a fully charged state. The four green Load Level indicators display an approximate level of load in 25% increments. If the UPS becomes loaded beyond full rating, the fifth (amber) indicator will illuminate and the UPS will sound an audible alarm. The display template indicates the percentage of load (see example at right) on the UPS output.



Normal Mode Operation
Batteries at 100% charge
L1 Load at 10%, L2 Load at 90%

10.2 Battery Mode Operation

Battery mode occurs in event of an extreme input voltage condition or complete utility failure. The battery system supplies power through the DC to DC converter to the inverter to generate power for the connected load. During battery mode an alarm sounds every 10 seconds. This will change to two beeps every 5 seconds when the battery runs low (approximately 2 minutes remaining, but this is user configurable). The AC Input indicator will extinguish and the Battery indicator will illuminate to warn that a utility problem has occurred. Each Battery Level indicator represents a 20% capacity level. As capacity decreases, fewer indicators remain illuminated. Refer to **13.0 - Troubleshooting**. For approximate battery run times, refer to **Table 6 - Battery run times**. These times are approximate based on resistive load and an ambient temperature of 77°F (25°C). To increase this time, turn off non-essential pieces of equipment (such as idle computers and monitors) or add the optional external battery cabinet.



Battery Mode Operation
Batteries at 30% charge
L1 Load at 60%, L2 Load at 60%

CAUTION

Turning OFF the UPS while in battery mode will result in loss of output power.

10.3 Battery Recharge Operation

Once utility power is restored, the UPS resumes normal operation. At this time, the Battery Charger begins recharging.

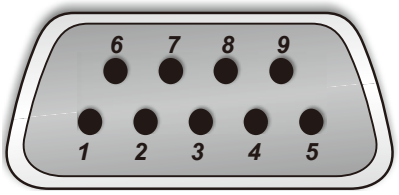
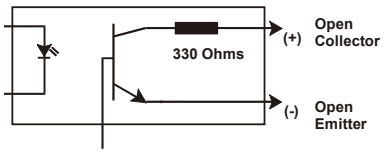
11.0 COMMUNICATIONS

11.1 Communications Interface Port

The RT 10Kva UPS has a standard DB-9 serial port female connector located on the rear of the UPS unit. Several signals are provided on this port and are assigned as follows:

Table 2 DB-9 pin assignment

DB-9 Pin	Assignment Description
1	Low Battery (open collector)
2	UPS TxD (typical RS-232 levels)
3	UPS RxD (typical RS-232 levels)
4	Remote Shutdown (5-12VDC, 10-24mA max; battery operation)
5	Common
6	Remote Shutdown (short to pin 5); all modes of operation
7	Low Battery (open emitter)
8	Utility Fail (open emitter)
9	Utility Fail (open collector)

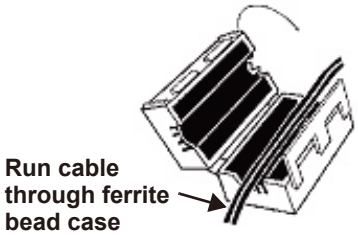
Pin Assignment	Collector to Emitter*
	

* Maximum voltage and current on pins 1, 7, 8 and 9 are 60VDC and 10.0 mA

11.1.1 DB-9 Interface Port

Using the following directions to attach the smaller enclosed ferrite bead clamp to the communication cable as shown at right:

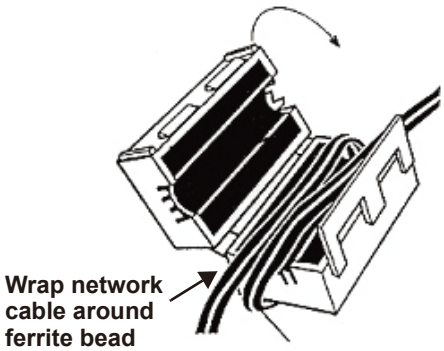
1. Open the ferrite bead.
2. Place the communication cable inside the ferrite bead groove.
3. Position the ferrite bead as close as possible to the end of the cable that connects to the DB-9 connector of the UPS.
4. Close the ferrite bead so that the ferrite bead's case snaps closed with the cable routed through the ferrite bead's case.



11.1.2 Communications—SNMP adapter - SNMP WEB CARD

Attach the larger enclosed ferrite bead clamp to the network cable, see illustration at right, using the following directions:

1. Open the ferrite bead.
2. Place the network cable inside the ferrite bead groove.
3. Wrap the cable once around the ferrite bead.
4. Position the ferrite cable as close as possible to the end of the cable that connects to the UPS.
5. Close the ferrite bead so that the ferrite bead's case snaps closed with the cable routed through the ferrite bead's case.



11.2 Pin 4 - Remote Shutdown on Battery

1. This pin is functional only when the UPS is in battery mode. If the UPS is being powered by the utility, Pin 4 will ignore any signal on this pin.
2. Pin 4 requires a 5-12 VDC signal to shutdown. This normally comes form the serial port using Sola/Hevi-Duty's contact closure cable. It cannot be used with just a contact closure unless the relay is used to switch a voltage source. A 5-12 VDC signal for 1.5 seconds or greater is required to signal a shutdown. Signals for less than 1.5 seconds will be ignored. After Pin 4 receives a shutdown signal for 1.5 seconds, the command cannot be canceled.
3. A battery shutdown signal on Pin 4 will NOT cause an immediate Shutdown. A shutdown signal will start a 2-minute shutdown timer. The timer cannot be stopped. After 2 minutes, the UPS will shut down.
4. If the utility returns during the 2-minute timer countdown, the shutdown timer will continue until the end of 2 minutes and the UPS will turn OFF. The UPS must remain OFF for at least 10 seconds even if AC input power Returns before the UPS turns OFF. This serves to reset and restart the server.

Whether the UPS turns back ON when power is restored depends on the auto-restart setting: enabled or disabled.

If the auto-restart is disabled, the UPS will not restart after performing the 2-minute shutdown delay.

CAUTION

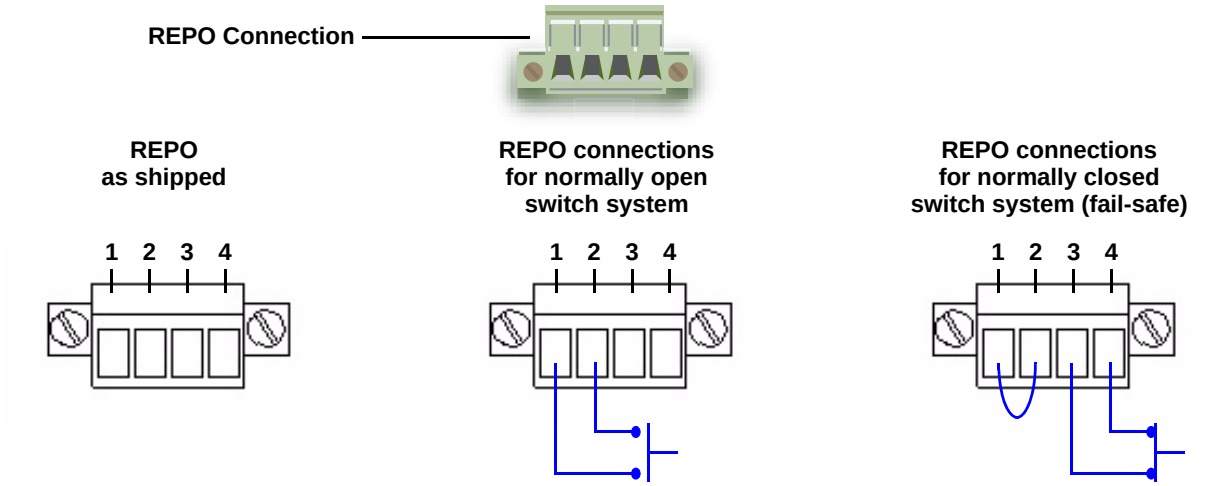
To maintain safety (SELV) barriers and for electromagnetic compatibility, signal cables should be segregated and run separate from all other power cables, where applicable.

11.4 Remote Emergency Power Off

The UPS is equipped with a Remote Emergency Power Off (REPO) connector.

The user must supply a means of interfacing with the REPO circuit to allow disconnecting the UPS input feeder breaker to remove all sources of power to the UPS and connected equipment to comply with national and local wiring codes and regulations.

Figure 9 REPO switch connections


REPO Connection
REPO as shipped
REPO connections for normally open switch system
REPO connections for normally closed switch system (fail-safe)
1 2 3 4
1 2 3 4
1 2 3 4

Key to REPO switch connections

1. 24 VDC
2. Sense
3. Sense
4. Common

CAUTION

To maintain safety (SELV) barriers and electromagnetic compatibility, signal cables should be segregated and run separately from power cables.

12.0 MAINTENANCE

The RT 10Kva requires very little maintenance. The batteries are valve-regulated, non-spillable, flame retardant, lead acid and should be kept charged to obtain their design life.
The UPS continuously charges the batteries when connected to the utility supply.

When storing the UPS for any length of time, it is essential to plug the UPS in for at least 24 hours every four to six months to ensure full recharge of the batteries. Failure to recharge the batteries periodically will permanently degrade battery capacity.

The RT 10Kva is designed to allow the user to safely replace the internal batteries. Read the safety cautions before proceeding. Contact your local distributor or sales representative to obtain the appropriate replacement battery kit part number and pricing.

12.1 Battery Replacement

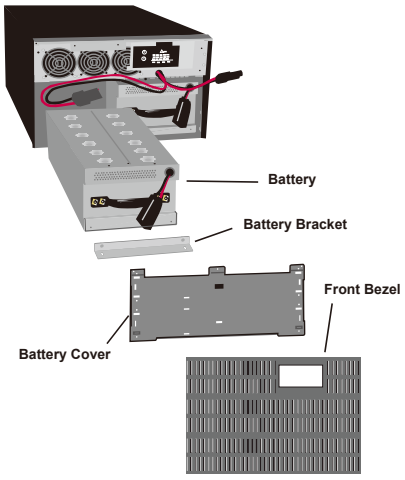
CAUTION

A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed before replacing the batteries:

- Remove rings, watches and other metal objects.
- Use a Phillips (crosshead) screwdriver with insulated grips.
- Do not lay tools or other metal objects on top of the batteries.
- If the battery replacement kit is damaged in any way or shows signs of leakage, contact your local distributor or sales representative immediately.
- Do not dispose of batteries in a fire. The batteries may explode.

12.1.1 Internal Battery Replacement Procedures

Both battery packs should be replaced at the same time.



1. Gently remove the front bezel by unscrewing the side mounted screws.
2. Loosen the three screws on the front battery cover grille. Lay the battery cover grille aside for reassembly.
3. Remove the battery brackets at the bottom front of the battery pack.
4. Grasp each battery pack assembly individually and pull each out of the front of the UPS. Be prepared to support the weight of the battery as it is withdrawn.
5. Unpack the new battery assemblies taking care not to destroy the packing. Compare new and old battery assemblies to make sure they are the same. If so, proceed with the next step. If they are different, STOP and contact your local distributor, sales representative or the Technical Support Group.
6. Line up and slide in the new replacement battery packs.
7. Reinstall the brackets on the front of the battery pack.
8. Reconnect the slotted battery cable connectors.
9. Reattach the front battery door, tightening the three screws.
10. Reattach the front metal bezel to the UPS.

NOTE

These are hot-swappable replacement batteries. However, caution should be exercised because during this procedure the load is unprotected from disturbances and power outages.

12.2 UPS Power Module Replacement

CAUTION

The UPS must be switched to manual bypass before personnel begin to replace the power module.

NOTE

During the procedure, the connected load will not be protected from power disturbances, such as spikes, sags and failure.

To remove the UPS power module without shutting off power to the connected load:

1. Place the UPS on internal bypass. This may be done by any of the three following methods:
   a. Press the Off button on the front panel one time.
   b. Slide the bracket away from the manual bypass breaker on the rear of the UPS—this requires loosening the captive screw and sliding the bracket away from the manual bypass breaker.
   c. Remove the front grille covering the power module.
2. Move the manual bypass breaker on the rear of the UPS to the bypass position—this requires loosening the captive screw and sliding the bracket away from the manual bypass switch (see **Figure 10**).
3. Open the input circuit breaker on the rear of the UPS (see **Figure 10**).
4. Open the output circuit breaker on the rear of the UPS (see **Figure 10**).
5. Remove the front metal bezel by unscrewing the side mounted screws
6. Remove the power module cover grille and the battery cover grille with the screws securing them to the frame.
7. Disconnect the slotted battery connectors from the internal battery packs.
8. If additional external batteries are used, disconnect the two external battery connectors.
9. Slide the power module out the front, supporting its weight as it is withdrawn.
10. Insert the replacement UPS power module.
11. Reconnect the slotted internal battery connectors.
12. Reconnect the external battery cables, if used.
13. Reattach both front cover grilles.
14. Reattach the front metal bezel.
15. Close the input circuit breaker on the rear of the UPS (see **Figure 10**).
16. Close the output circuit breaker on the rear of the UPS (see **Figure 10**).
17. Move the bypass breaker on the rear of the UPS back to the INVERTER position (see **Figure 10**).
18. Slide the bracket back next to the manual bypass breaker and tighten its thumbscrew.
19. Press the On button on the front panel one time to return the UPS to Normal Mode operation.

Figure 10 UPS back panel—control location

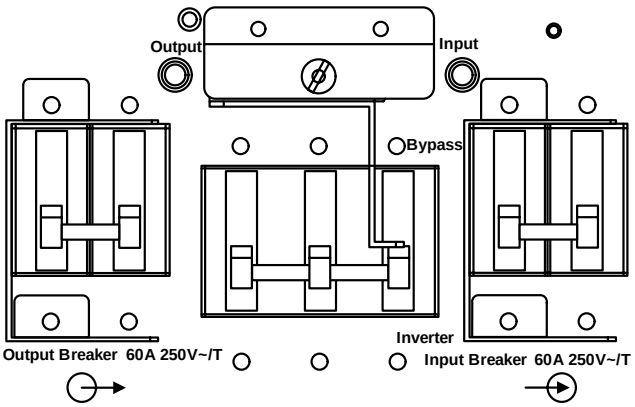
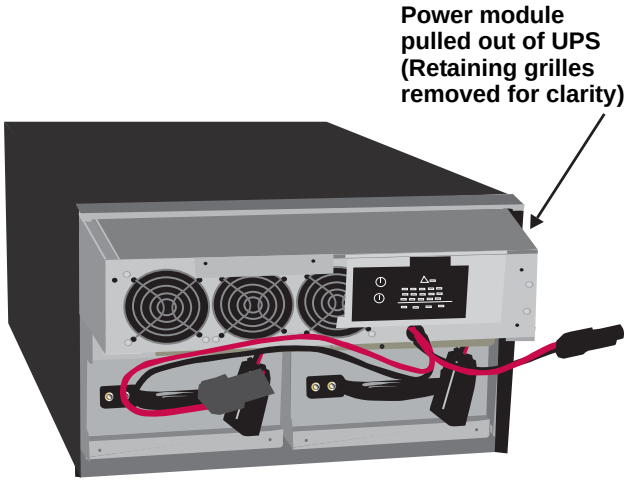


Figure 11 Power module replacement



13.0 TROUBLESHOOTING

The information below indicates various symptoms a user may encounter in the event the RT 10Kva develops a problem. Use this information to determine whether external factors caused the problem and how to remedy the situation.

1. The Fault indicator will illuminate, indicating the UPS has detected a problem.
2. An alarm will sound, alerting that the UPS requires attention.
3. One or more additional Load Level/Battery Level indicators will be illuminated to provide a diagnostic aid to the operator, as described below:

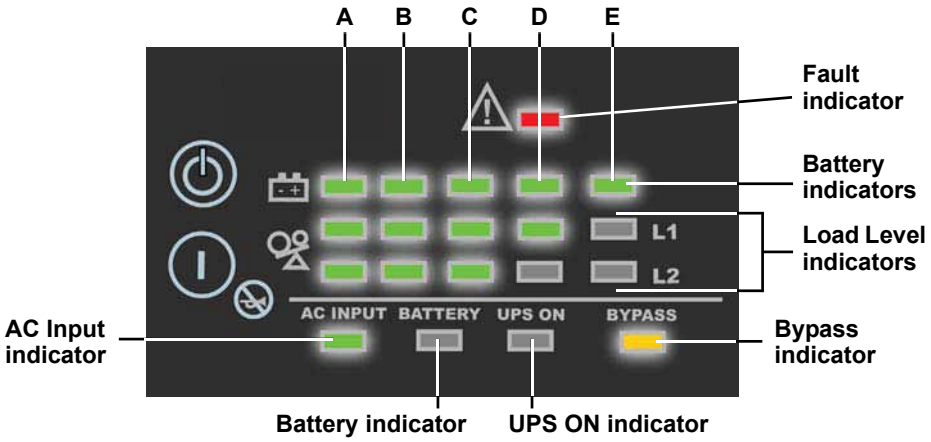


Table 3 Fault indicators

Indicator status	Diagnosis/Audible alarm
All indicators	On bypass due to output overload; beep every half-second
Indicator A	On bypass due to overtemperature condition
Indicator B	On bypass due to DC bus overvoltage
Indicator C	On bypass due to control power supply failure
Indicator D	On bypass due to PFC failure
Indicator E	On bypass due to inverter failure
Indicators A&B	Inverter-to-Inverter communications failure; half-second beep every 1 second
Indicators A&C	UPS failed battery test; 2-second beep every 60 seconds
Indicators A&D	L1 to L2 phase angle unacceptable
Indicators B&C	REPO is currently activated, UPS output cannot be started by any method
Indicators B&D	UPS is OFF due to previous REPO (REPO is no longer activated). Once utility power is restored, press the OFF button twice within four seconds (to clear the alarm), then press the ON button to start UPS (Auto-restart is NOT possible).
Indicators C&E	UPS shutdown due to command from communications (RS232 or SNMP); no beep
Indicators D&E	UPS is OFF due to charger overvoltage; 1-second beep every 4 seconds
AC Input indicator On & Indicators A&C&E	On bypass due to the power module cover plate being removed or the slide bracket moved from Manual Bypass switch
AC Input indicator On & Battery indicator Flashing	AC input has been applied to start UPS but the batteries are either missing or below the minimal level to allow the UPS to start; continuous audible alarm
Bypass indicator Flashing	Bypass voltage is present, but is disabled for use because the voltage or frequency is outside acceptable limits

Under fault conditions, the Fault indicators will be illuminated indefinitely while the battery charger is operational, or for a maximum of 5 minutes while the battery charger is not operational.

If a problem persists, consult your local distributor, Sales representative or contact the Technical Support Group. Please have the UPS model number and serial number available at the time of your inquiry.

All audible alarms can be silenced, with the exception of Low Battery, Bypass Reminder and Missing Batteries at Startup alarms. Once silenced, the alarm will not sound again until a new alarm condition is present.

Table 4 Alarm conditions

Condition	Alarm
Battery Mode (utility failure)	One short beep every 10 seconds; more than 2 minutes of run time remaining
Low Battery	Two short beeps every 5 seconds; less than 2 minutes of run time remaining
On Bypass Reminder	A one-second beep every 2 minutes
On Internal Bypass (to notify user to rotate manual maintenance switch to Bypass position)	A one-second beep every 2 seconds
Output Overload (bypass)	One short beep every half second
Overtemperature (bypass)	A one-second, or two-second, beep every 4 seconds
DC Bus Overvoltage (bypass)	A one-second, or two-second, beep every 4 seconds
Control Power Supply Failure (bypass)	A one-second, or two-second, beep every 4 seconds
PFC Failure (bypass)	A one-second, or two-second, beep every 4 seconds
Inverter Failure	A one-second, or two-second, beep every 4 seconds
Inverter-to-Inverter Communication Failure	A one-half second beep every 1 second
Battery Test Failure	A two-second beep every 1 minute
REPO Activated	A one-quarter second beep every half second

Table 5 Troubleshooting guide

Problem	Cause	Solution
UPS fails to start when the ON button is pressed.	UPS is short-circuited or overloaded.	Ensure the UPS is OFF. Disconnect all loads and ensure nothing is lodged in output receptacles. Ensure the loads are not defective or shorted internally.
Battery indicator is illuminated.	UPS not plugged in.	UPS is operating in Battery Mode, make certain UPS is securely plugged into the wall receptacle.
	UPS input protection fuse has blown/opened.	UPS is operating in Battery Mode. Save data and close applications. Replace UPS input fuse, then restart UPS.
	Utility voltage out of UPS input range.	UPS is operating in Battery Mode. Save data and close applications. Ensure utility supply voltage is within acceptable limits for UPS.
UPS has reduced battery time.	Batteries are not fully charged.	Keep UPS plugged in continuously at least 24 hours to recharge batteries.
	UPS is overloaded.	Check load level display and reduce the load on the UPS.
	Batteries may not be able to hold a full charge due to age.	Replace batteries. Contact your local distributor, sales representative or the Technical Support Group for replacement battery kit.
Fault and Bypass indicators and all Load Level indicators are illuminated.	UPS overloaded or load equipment is faulty.	Check load level display and remove non-essential loads. Recalculate the load and reduce number of loads connected to UPS. Check load equipment for faults.
Fault and Bypass indicators and diagnostic indicator C are illuminated.	UPS control power supply fault.	UPS requires service. Contact your local distributor, sales representative or the Technical Support Group.
Fault and Bypass indicators and diagnostic indicator D are illuminated.	UPS PFC (Power Factor Correction Circuit) fault.	UPS requires service. Contact your local distributor, sales representative or the Technical Support Group.
Fault and Bypass indicators and diagnostic indicator A are illuminated.	UPS internal fan has a problem or UPS shutdown due to temperature condition. Load is on bypass power.	Ensure the UPS is not overloaded, ventilation openings are not blocked and room ambient temperature is not excessive. Wait 30 minutes to allow UPS to cool, then restart UPS. If UPS does not restart, contact your local local distributor, sales representative or the Technical Support Group.
Fault and Bypass indicators and diagnostic indicator B are illuminated.	UPS internal DC bus overvoltage.	UPS requires service. Contact your local distributor, sales representative or the Technical Support Group.
Fault and Bypass indicators and diagnostic indicator E are illuminated.	UPS inverter fault.	UPS requires service. Contact your local distributor, sales representative or the Technical Support Group.
Fault and Bypass indicators and diagnostic indicators A and B are illuminated.	Inverter-to-Inverter Communications Failure	UPS requires service. Contact your local distributor, sales representative or the Technical Support Group.
Fault indicator and diagnostic indicators A and C are illuminated.	UPS failed the battery test.	Replace batteries. local distributor, sales representative or the Technical Support Group.
Fault indicator and diagnostic indicators A and D are illuminated.	L1 to L2 phase angle unacceptable.	Only phase angles of 120, 180 or 240 degrees (±10 degrees) are permitted. These must be compatible with the selections in the configuration program. Or the phase angle has changed while the UPS was running. The phase angle is detected at startup and cannot be changed to a different power source while running. Turn the UPS Off and wait until the fans stop. Apply input AC power. The UPS will reprogram the phase angle to AC power. The UPS will reprogram the phase angle to match the utility, if the utility is 120, 180 or 240 degrees between L1 and L2. If this does not resolve the issue, contact a qualified electrician to verify the site wiring.
Fault indicator and diagnostic indicators B and C are illuminated.	REPO is currently activated.	UPS has shut down due to the REPO (Remote Emergency Power Off). The output cannot be started by any method.

Table 5 Troubleshooting guide (continued)

Problem	Cause	Solution
Fault indicator and diagnostic indicators B and D are illuminated.	UPS output is OFF from a previous REPO command. REPO is no longer activated.	UPS is OFF due to previous REPO (REPO is no longer activated). Once utility power is restored, press the OFF button twice within four seconds (to clear the alarm), then press the ON button to start UPS (Auto-restart is NOT possible).
Fault indicator and diagnostic indicators C and E are illuminated.	UPS shutdown due to a command from the communications port(s).	Your UPS has received a signal or command from the attached computer. If this was inadvertent, ensure the communication cable used is correct for your system. For assistance, contact your local dealer, sales representative or Technical Support Services.
Fault indicator and diagnostic indicators D and E are illuminated.	UPS charger fault.	UPS requires service. Contact your local dealer, sales Representative or Technical Support Services.
AC Input indicator is On & diagnostic indicators A, C and E are illuminated.	On Internal Bypass to notify user to rotate manual maintenance bypass switch to Bypass position.	Rotate manual bypass switch to the Bypass position, then follow the instructions for replacing the UPS power module (see **12.2 - UPS Power Module Replacement**).
AC Input indicator is On & Battery indicator is flashing.	Battery source is not available; continuous horn.	Check battery connections, completely power down and restart UPS. NOTE: If the battery circuit opens while the UPS is running, it will be detected when the next battery test is performed.
Bypass indicator is flashing.	Bypass voltage is present, but is disabled for use because the voltage or frequency is outside acceptable limits.	The AC input powers the PFC input and serves as the bypass source. If the AC is present but the voltage or frequency exceeds the acceptable range for safe operation with a load, the bypass will be disabled and this indicator will flash, indicating that the bypass is unavailable.

The following table shows runtimes with up to 3 Battery Packs. 1 Battery Pack is the normal configuration.

Table 6 shows estimated run times at different loads.

Table 6 Battery run times

Battery/External Cabinets	Load%	10000VA Run Time in Minutes
Internal Battery	10%	107
	20%	52
	30%	31
	40%	22
	50%	16
	60%	13
	70%	10
	80%	9
	90%	7
	100%	6
Internal Battery + 1 External Battery Cabinet	10%	251
	20%	118
	30%	74
	40%	52
	50%	39
	60%	32
	70%	26
	80%	22
	90%	19
	100%	17
Internal Battery + 2 External Battery Cabinets	10%	333
	20%	216
	30%	118
	40%	85
	50%	66
	60%	53
	70%	44
	80%	38
	90%	32
	100%	28
Internal Battery + 3 External Battery Cabinets	10%	494
	20%	265
	30%	191
	40%	119
	50%	92
	60%	75
	70%	62
	80%	54
	90%	47
	100%	41

14.0 SPECIFICATIONS

Table 7 UPS specifications

Model Number	RT 10Kva
Model Rating	8000W/8660VA at 127/220 (120 or 240 degrees only)
	8000W/8660VA at 120/208 (120 or 240 degrees)
	8000W/10000VA at 120/240 (180 degrees)
	8000W/10000VA at 115/230 (180 degrees only)
	7200W/9000VA at 110/220 (180 degrees only)
	6400W/8000VA at 100/200 (180 degrees only)
DIMENSIONS in (mm)	
Unit W x D x H in. (mm)	10.5 x 25.98 x 16.93 (267 x 660 x 430)
Shipping W x D x H in. (mm)	16.5 x 34.3 x 22.8 (420 x 870 x 580)
WEIGHT lbs (kg)	
Unit	109 (49.3)
Shipping	118 (53.6)
INPUT AC PARAMETERS	
Nominal Operating Frequency	50 or 60 Hz (Factory Default = 60)
Factory Default VAC	127/220 VAC at 120 degrees
L1-L2 Factory Default Input Phase Angle	120 degrees
Allowable Input Phase Angle	120, 180, 240 degrees, Auto-sensing on application of AC (Restrictions for L-N voltages other than 120 VAC)
Factory Default L1-N, L2-N VAC	127 VAC nominal
User Configurable L1-N, L2-N VAC	100/110/115/120/127 VAC (May be modified using configuration program)
L1-N, L2-N, Operating Voltage Range Without Battery Operation (Except 100 VAC L-N Operation)	
100% - 90% loading	90 VAC - 140 VAC
90% - 70% loading	80 VAC - 140 VAC
70% - 30% loading	70 VAC - 140 VAC
30% - 0% loading	60 VAC - 140 VAC
L1-N, L2-N, Operating Voltage Range Without Battery Operation (100 VAC L-N Operation)	
100% - 70% loading	80 VAC - 140 VAC
70% - 30% loading	70 VAC - 140 VAC
30% - 0% loading	60 VAC - 140 VAC
L1-N, L2-N Max. Allowable VAC	150 VAC
Input Frequency w/o Battery Operation	40 - 70 Hz
Input Power Connection	Hardwire Terminal Block 3W + G (L-L-N-G)
OUTPUT AC PARAMETERS	
Factory Default VAC	127/220 VAC @ 120 degrees
L1-L2 Factory Default Output Phase Angle	120 degrees
Allowable Output Phase Angle	120, 180, 240 degrees Auto-sensing on initial application of input AC
Factory Default L1-N, L2-N VAC	127 VAC nominal
User Configurable L1-N, L2-N VAC	100/110/115/120/127 VAC, ±3%
Output Connections	Hardwire Terminal Block 3W + G (L-L-N-G); also see **7.2 - Output Receptacle Distribution Options**
Frequency	50 Hz or 60 Hz, Nominal
Waveform	Sinewave
Main Mode Overload	200% for 8 cycles then shutdown; 130% for 60 seconds with transfer to bypass

Table 7 UPS specifications (continued)

Model Number	RT 10Kva
Bypass Protection Limits	
Disable Bypass operation	If input voltage exceeds ±15% of the nominal voltage
Re-enable Bypass operation	If input voltage returns to within ±10% of nominal output voltage
Disable Bypass operation	When the input frequency prevents synchronous operation
ENVIRONMENTAL	
Operating Temp	+32°F to +104°F (0°C to +40°C)
Storage Temp	+5°F to +122°F (-15°C to +50°C)
Relative Humidity	0% to 95%, non-condensing
Operating Elevation	Up to 10,000 ft. (3000m) at 104°F (40°C) without derating
Storage Elevation	50,000 ft. (15,000 m) maximum
Audible Noise	<55 dBA, at 1 meter
AGENCY	
Safety	UL 1778, c-UL Listed (Suitable for computer room applications)
RFI/EMI	FCC Part 15, Subpart B, Class A
Surge Immunity	IEEE/ANSI C62.41 Category A & B
Transportation	ISTA Procedure 1A

Table 8 Battery specifications

DIMENSIONS in (mm)	
Shipping W x D x H in. (mm)	11.0 x 24.8 x 16.5 (280 x 630 x 420)
WEIGHT lbs (kg)	
Unit	78.1 (35.5)
Shipping	83.6 (38)
Type	Valve-regulated, non-spillable, flame retardant, lead acid
Quantity x V x Rating	(2) x 12 x 12V x 9.0 AH
Battery Mfg / Part #	Yuasa / REW 45-12 FR
Back-Up Time	See **Table 6 - Battery run times**
Recharge Time	6 Hours to 90% capacity after full discharge into 100% load

Table 9 Optional output distribution specifications

DIMENSIONS in (mm)	
Shipping W x D x H in. (mm)	7.87 x 8.85 x 10.43 (200 x 225 x 265)
WEIGHT lbs (kg)	
Unit	3.8 (1.7)
Shipping	5.1 (2.3)
ELECTRICAL SPECIFICATIONS	
Amp Rating	60 Amps
Input Power Connections	Internal Anderson connectors
Output Power Connection	
L1-L2-G	(2) L6-30R on a 300mm cord
L1-N-G	(4) 5-15/20R, T-type, receptacles with (2) 20A circuit breakers
L2-N-G	(4) 5-15/20R, T-type, receptacles with (2) 20A circuit breakers

DIMENSIONS in (mm)	
Shipping W x D x H in. (mm)	7.87 x 8.85 x 10.43 (200 x 225 x 265)
WEIGHT lbs (kg)	
Unit	4.6 (2.1)
Shipping	6.0 (2.7)
ELECTRICAL SPECIFICATIONS	
Amp Rating	60 Amps
Input Power Connections	Internal Anderson connectors
Output Power Connection	
L1-L2-G	(4) L6-20R on a 300mm cord
L1-N-G	(2) 5-15/20R, T-type, receptacles with (1) 20A circuit breaker
L2-N-G	(2) 5-15/20R, T-type, receptacles with (1) 20A circuit breaker

Table 10 External battery cabinet specifications

DIMENSIONS in (mm)	
Unit (with bezel) W x D x H	7.0 x 25.98 x 16.93 (178 x 660 x 430)
Shipping W x D x H	13.0 x 34.3 x 22.8 (330 x 870 x 580)
WEIGHT lbs (kg)	
Unit	41.6 (18.9)
Shipping	50.6 (23)
BATTERY PARAMETERS (2 Required)	
Type	Valve-regulated, non-spillable, flame retardant, lead acid
Qty x V x Rating	(2) x 12 x 12V x 9.0 AH
Battery Mfg / Part #	Yuasa / REW 45-12 FR
Back-Up Time	See **Table 6 - Battery run times**
ENVIRONMENTAL	
Operating Temp	+32°F to +104°F (0°C to +40°C)
Storage Temp	+5°F to +122°F (-15°C to +50°C)
Relative Humidity	0% to 95%, non-condensing
Operating Elevation	Up to 10,000 ft. (3000m) at 104°F (40°C) without derating
Storage Elevation	50,000 ft. (15,000m) maximum
AGENCY	
Safety	UL 1778, c-UL Listed (Suitable for computer room applications)
RFI/EMI	FCC Part 15, Subpart B, Class A
Transportation	ISTA Procedure 1A

Table 11 Replacement 10kVA power module specifications

DIMENSIONS in (mm)	
Shipping W x D x H	9.9 x 28.1 x 22.3 (251 x 715 x 565)
WEIGHT lbs (kg)	
Shipping	59.5 (27)
ENVIRONMENTAL	
Storage Temp	-5°F to +122°F (-15°C to +50°C)
Relative Humidity	0% to 95%, non-condensing
Storage Elevation	50,000 ft. (15,000m) maximum

Orion Power Systems Service and Technical Support

If you have any problems or questions with the UPS, call your local distributor or
Orion Power Systems technical support at the following telephone number :
In the United States: **1-877-385-1654**
Please have the following information ready when you call:
- Model number and Serial number - Description of failure or problem
- Date of failure or problem - Customer contact information and return address

If repair is necessary, you will be given a (RMA) number. The RMA number must appear on the outside of the box and on the Bill Of Lading. Original packaging should be used if available. Systems that get damaged in transit as a result of improper packaging are
not covered under warranty. A replacement or repair unit will be shipped,
freight prepaid for all units under warranty.
NOTE: *For critical applications, immediate replacement may be available.*